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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,079	09/09/2003	Juzer Jangbarwala	434830-002	1434
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THOMPSON HINE L.L.P. 2000 COURTHOUSE PLAZA , N.E. 10 WEST SECOND STREET DAYTON, OH 45402			ZHENG, LOIS L	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/658,079

Applicant(s)

JANGBARWALA, JUZER

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-26,29,30 and 32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-26,29,30 and 32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 November 2005 has been entered.

### ***Status of Claims***

2. Claims 1, 29-30 and 32 are amended in view of the amendment filed 10 November 2005. Claims 2, 27-28 and 31 are canceled in view of the amendment. Therefore, claims 1, 3-26, 29-30 and 32 are currently under examination.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1 and 3-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the amended feature of "wherein said electric current resistively heats said catalyst, thereby disproportionately increasing

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a temperature of said catalyst with respect to said support" as recited in instant claim 1 is not described in the original specification. Claims 3-26 are rejected since they depend on instant claim 1.

5. Claim 29 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the amended feature of "wherein said electric current resistively heats said catalyst such that a temperature of said catalyst substantially increases with respect to said electrically conductive carbonaceous material" as recited in instant claim 29 is not described in the original specification.

6. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the amended feature of "wherein said electric current resistively heats said catalyst such that a temperature of said catalyst substantially increases with respect to said support" as recited in instant claim 30 is not described in the original specification.

7. Claim 32 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the claimed feature of "wherein said electric current resistively heats said catalyst such that a temperature of said catalyst substantially increases with respect to said support" is not supported by the original specification.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 3-11, 17, 22-26, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe US 6,641,795 B2(Abe) in view of Puskas et al. US 4,415,479(Puskas).

Abe teaches method to electrically heating a catalyst unit comprising a catalyst on a support that is electrically heatable(abstract). The catalyst is used in reformer reactions such as steam reforming reactions using methanol(col. 5 line 18 – col. 6 line 12).

However, Abe does not explicitly teach the support material is a carbonaceous material as claimed.

Puskas teaches a catalyst comprising palladium adsorbed on the surface of a porous carbonaceous support material such as activated carbon granules(col. 5 lines 47-56, claim 1).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the activated carbon granules of Puskas as the catalyst support in the electrically heatable catalyst unit of Abe in order to produce a catalyst with increase catalytic activity and selectivity as taught by Puskas (col. 1 lines 29-43).

Regarding claims 1, 29-30 and 32, Abe in view of Puskas disclose a catalyst supported by activated carbon granules that is electrically heatable, which reads on the claimed electrically conductive catalyst support. The catalyst of Abe in view of Puskas can be used in chemical reactions such as a steam reforming reaction. Therefore, Abe in view of Puskas meet the intended use of "for conducting a chemical reaction in the presence of a catalyst". In addition, the catalyst support of Abe in view of Puskas(i.e. activated carbon granules) is electrically conductive and is electrically heated, which implies passing of current from the support to the catalyst when an electric current is applied to the support. Furthermore, since Abe in view of Puskas teaches the same electrically conductive carbonaceous material as catalyst support and applying an electric current to the catalyst support(i.e. via electrical heating), the claimed electric current resistively heating the catalyst, thereby substantially increasing the catalyst temperature with respect to the support inherently takes place in the process of Abe in view of Puskas. The instant claim also does not provide limitation to the temperature rise of the catalyst support, the instant claim does not preclude co-occurrence of thermal heating of the catalyst from the catalyst support.

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Regarding claim 3, 5-7 and 22, Abe further teaches the catalyst may be Pd, Pt, Co, Ni, etc. The metal catalyst is loaded on a heat-resistant oxide such as  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{MgO}$ , etc.(col. 12 lines 28-67).

Regarding claims 4, 17 and 25, since the instant claims all depend on the independent claim 1, the examiner is taking the position that the activated carbon granules as catalyst support as taught by Abe in view of Puskas encompasses the claimed carbon fiber and the woven or nonwoven carbon fiber cloth or felt or plug. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed carbon fiber, the woven or nonwoven carbon fiber cloth or felt or plug from the activated carbon granules disclosed by Abe in view of Puskas would have been obvious to one of ordinary skill in the art since Abe in view of Puskas teach the same utility in their activated carbon granules.

Regarding claims 8 and 9, Abe further teaches that the surface area of the catalyst carrier is in the range of 5 – 300  $\text{m}^2/\text{g}$ (col. 12 lines 47-61), which reads on the claimed surface area of about 1 – 1000  $\text{m}^2/\text{g}$  as recited in instant claim 9. Abe further teaches that a heater unit containing sintered  $\text{ZnO}_2$  carried catalyst(col. 6, line 61 – col. 7 line 20). Even though Abe in view of Puskas do not explicitly teach the claimed carrier pore diameter of about 1 to about 100Angstroms as recited in instant claim 8, the catalyst carrier of Abe in view of Puskas inherently meets the claimed pore size since Abe in view of Puskas teach the same catalyst carrier with the same surface area as claimed.

Regarding claims 10-11 and 26, Abe further teaches that the catalyst unit having electrodes on each side of the catalyst unit(col. 9 lines 21-33). Therefore, the activated carbon granule supported catalyst in a catalyst unit between two electrodes as taught by Abe in view of Puskas meets the limitations of instant claims 10-11 and 26.

Regarding claim 23, Abe further discloses that the steam reforming reaction temperature is 500°C(col. 5 line 67), which inherently meets the claim limitation of electrically heating up the catalyst for about 50 – 1200 degree C, since the catalyst would also needed to be heat up to the reaction temperature.

Regarding claim 24, Abe further teaches the claimed steam reforming reaction using methanol(col. 5 line 18 – col. 6 lines 12).

10. Claims 4 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Puskas, and further in view of Parmentier et al. US 6,383,972 B1 (Parmentier).

The teachings of Abe and Puskas are discussed in paragraph 9 above.

However, Abe in view of Puskas do not explicitly teach the claimed catalyst support being carbon fiber or woven/unwoven carbon fiber cloth or felt.

Parmentier teaches using activated carbon fiber fabric as support for catalyst such as Pt, Pd, Ni, etc.(abstract, col. 1 line 49 – col. 2 line 53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the activated carbon fiber fabric of Parmentier to support the catalyst of Abe in view of Puskas since Parmentier teaches



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that the activated carbon fabric(i.e. woven carbon fiber cloth) is a functional equivalent catalyst support for the catalyst of Abe in view of Puskas.

Regarding claims 4 and 17, the activated carbon fiber fabric as taught by Abe in view of Puskas and Parmentier read on the instantly claimed carbon fiber and woven carbon fiber cloth.

Regarding claim 12, Parmentier further teaches that the carbon fibers have a mean pore size of 0.3nm – 3nm with a total porosity of 30-50% (col. 2 lines 32-36). Since Abe teaches that the support total porosity of 50% or more, the catalyst support of Abe in view of Puskas and Parmentier inherently has a total porosity of 50% or more, which means that the pore size of the catalyst support of Abe in view of Puskas and Parmentier would be 3nm or more, which overlaps the claimed pore diameter of about 0.005 to about 0.2 micrometer as recited in instant claim 12. Therefore, a prima facie case of obviousness exists. The selection of the claimed pore diameter range from the pore size range of Abe in view of Puskas and Parmentier would have been obvious to one of ordinary skill in the art since Abe in view of Puskas and Parmentier teach the same utility in their disclosed pore size range.

Regarding claims 13-15, since heat conductivity, electrical resistivity and dielectric constant are inherent properties of the catalyst support and Abe in view of Puskas and Parmentier disclose a significantly similar catalyst support as the instant invention(i.e. same material and overlapping pore size), one of ordinary skill in the art would have expected the properties, such as heat conductivity, electrical resistivity and dielectric constant, to be the same as claimed. Therefore, a prima facie case of

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obviousness exists. The selection of claimed heat conductivity, electrical resistivity and dielectric constant ranges from the disclosed ranges of Abe in view of Puskas and Parmentier would have been obvious to one of ordinary skill in the art since Abe in view of Puskas and Parmentier teach the same utilities in their heat conductivity, electrical resistivity and dielectric constant ranges.

Regarding claim 16, since Abe in view of Puskas and Parmentier teach a support for metal catalyst loaded in a carrier that is significantly similar to that of the instant invention(i.e same material for the support, the catalyst and the catalyst carrier, similar carrier pore size, surface area, similar support pore size and quality), the amount of catalyst present on the support would have inherently overlap the claimed amount of about 1 microgram to 10 gram per  $\text{cm}^3$ . Therefore, a prima facie case of obviousness exists. The selection of the claimed amount of catalyst in the support from the amount disclosed by Abe in view of Puskas and Parmentier would have been obvious to one of ordinary skill in the art since Abe in view of Puskas and Parmentier teach the same utility in their catalyst amount range.

Regarding claim 18, Parmentier further teaches that the fabric is shaped by rolling after the catalyst has been uniformly distributed through out the support(col. 3 lines 12-19). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the technique rolling of the catalyst support as taught of Parmentier into the process of Abe in view of Puskas in order to impart cohesion to the shaped support as taught by Parmentier(col. 3 lines 12-19). In addition, Abe further teaches that the catalyst is disposed in the flow path of a reactant fluid during the reaction(col. 6

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lines 4-8). Therefore, Abe in view of Puskas and Parmentier meet the limitation of instant claim 18.

11. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Puskas, and further in view of Colbert US 6,824,755 B2(Colbert).

The teachings of Abe and Puskas are discussed in paragraph 9 above.

However, Abe in view of Puskas do not explicitly teach the claimed polymeric adsorbent such as an ion exchange resin.

Colbert teaches the using of ion exchange resin covered carbon nanotube as catalyst support(col. 13 lines 29-33).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the ion exchange resin covered carbon nanotube of Colbert into the process of Abe in view of Puskas at the catalyst support since Colbert's ion exchange resin covered carbon nanotube is functionally equivalent to the catalyst support of Abe in view of Puskas.

Regarding claims 19-20, the ion exchange resin covered carbon nanotube catalyst support as taught by Abe in view of Puskas and Colbert read on the polymeric adsorbent catalyst support such as an ion exchange resin as recited in the instant claims.

Regarding claim 21, Abe further teaches that the catalyst is used in the form of beads as claimed.

12. Claim 1, 5, 23, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affleck et al US 4,868,841(Affleck) in view of Puskas.

Affleck teaches a directly heated ceramic catalytic support that is heat and electrically conductive(abstract).

However, Affleck does not explicitly teach that the claimed catalyst support being an electrically conductive carbonaceous material as claimed.

Puskas teaches a catalyst comprising palladium adsorbed on the surface of a porous carbonaceous support material such as activated carbon granules(col. 5 lines 47-56, claim 1).

With respect to amended claims 1, 29-30 and 32 of the instant invention, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the activated carbon granules of Puskas as the catalyst support for the electrical heating of catalyst as taught by Affleck in order to produce a catalyst with increase catalytic activity and selectivity as taught by Puskas (col. 1 lines 29-43). In addition, the catalyst support of Affleck in view of Puskas(i.e. activated carbon granules) is electrically conductive, which implies passing of current from the support to the catalyst as claimed. Furthermore, since Affleck in view of Puskas teach the same electrically conductive carbonaceous material as catalyst support and applying an electric current to the catalyst support(i.e. via electrical heating), the claimed electric current resistively heating the catalyst, thereby substantially increasing the catalyst temperature with respect to the support inherently takes place in the process of Affleck in view of Puskas. The instant claim also does not provide limitation to the temperature rise of the catalyst support, the instant claim does not preclude co-occurrence of thermal heating of the catalyst from the catalyst support.

With respect to claim 5 of the instant invention, Affleck further teaches that the desired catalyst is Pt(abstract, col. 2 lines 20-64).

With respect to claim 23 of the instant invention, Affleck further teaches that the catalyst support is heated to about 350°C by an electrical current(col. 3 lines 26-62, col. 4 lines 15-20, col. 5 lines 5-50), which read on the claimed catalyst temperature increase of about 50 – about 1200°C.

### ***Response to Arguments***

13. Applicant's arguments filed on 10 November 2005 have been considered, but are not persuasive.

14. The declaration under 37 CFR 1.132 filed 10 November is insufficient to overcome the rejection of claims 1, 3-26, 29-30 and 32 based upon 35 U.S.C. 112, first paragraph, new matter rejection as set forth in the last Office action because: The Declaration lacks factual evidence showing the "substantial or disproportion" temperature difference between the catalyst and the support . The Declaration also lacks factual evidence showing that the temperature of the support remains substantially the same before and after the catalyst activation. For example, in paragraph 13, the statement of heating being generated at the site of any catalyst(claims 1, 29-30) does not exclude the heating of the support. Therefore, it does not clearly suggest that the catalyst is being disproportionately heated relative to the support as asserted. In paragraph 14, there is no factual evidence for the assertion that the temperature of the catalyst substantially increases with respect to the support when an electric current is applied to the conductive carbonaceous support having any

catalyst dispersed therein. In paragraph 15, no temperature data for Cu/Zr/Al catalyst and carbon cloth are provided in Example 2. Furthermore, the example 2 is not commensurate in scope with the instant claims 1 and 29-30. Therefore, the examiner does not consider applicant's arguments persuasive.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

  
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